

ABSTRACT OF THE DISCLOSURE

Provided is a method for manufacturing a semiconductor device, including a dual-stage deposition step including: a first stage for introducing tantalum penta-ethoxide containing tantalum as a material gas into a reaction chamber in which a semiconductor substrate on a surface of which a lower electrode is made of ruthenium is placed to thus form a tantalum oxide film by a vapor-phase growth method such as a chemical vapor deposition method and the following second stage for removing from the reaction chamber the material gas introduced into the reaction chamber at the first stage and a byproduct produced at the first stage by introducing a nitrogen gas, and wherein the tantalum oxide film is formed on the semiconductor substrate, by repeating the dual-stage deposition step two or more times.